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(9) BUREAU OF SHIPS GROUP (10)  
| TECHNICAL INSPECTION REPORT

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By Authority of Joint Chiefs of Staff Action of 11 April 1947  
John D. Beggs, Jr. Date 24 August 51

(6) OPERATION CROSSROADS,  
U.S.S. GENEVA (APA 86).

(8) TEST ABLE U.S.

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OPERATION CROSSROADS

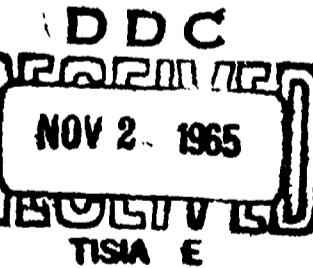
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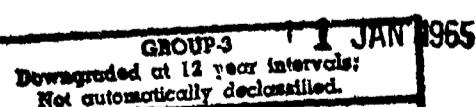
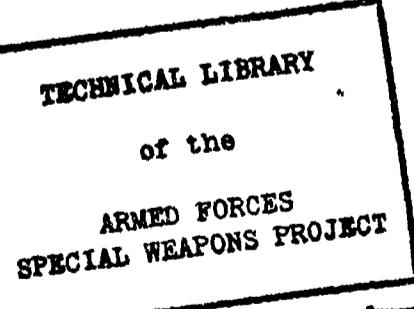
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TECHNICAL INSPECTION REPORT

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By Authority of Joint Chiefs of Staff Action of 11 April 1949  
By *John B. Biggs, Capt* Date *24 Sept 51*  
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F.X. Forest,  
Captain, U.S.N.

USS GENEVA (APA86)

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U.S.S. GENEVA (APA 86)

SHIP CHARACTERISTICS

Building Yard: Consolidated Steel Corp.; Wilmington, California.

Commissioned: 22 March 1945.

HULL

Length Overall: 426 feet 0 inches.

Length on Waterline: 400 feet 0 inches.

Beam (extreme): 58 feet 0 inches.

Depth (molded to upper deck): 37 feet 0 inches.

Drafts at time of test: Fwd. 11 feet 6 inches.

Aft. 17 feet 6 inches.

Limiting displacement: 7,080 tons.

Displacement at time of test: 6,359 tons.

MAIN PROPULSION PLANT

Main Engines: Two sets of Westinghouse steam turbines, directly connected to Westinghouse main generators. Two main propulsion motors.

Main Condensers: Two are installed in ship.

Boilers: Two Babcock and Wilcox boilers are installed in ship. 465 psi gauge - 750° F.

Propellers: Two are installed in ship.

Main Shafts: Two are installed in ship.

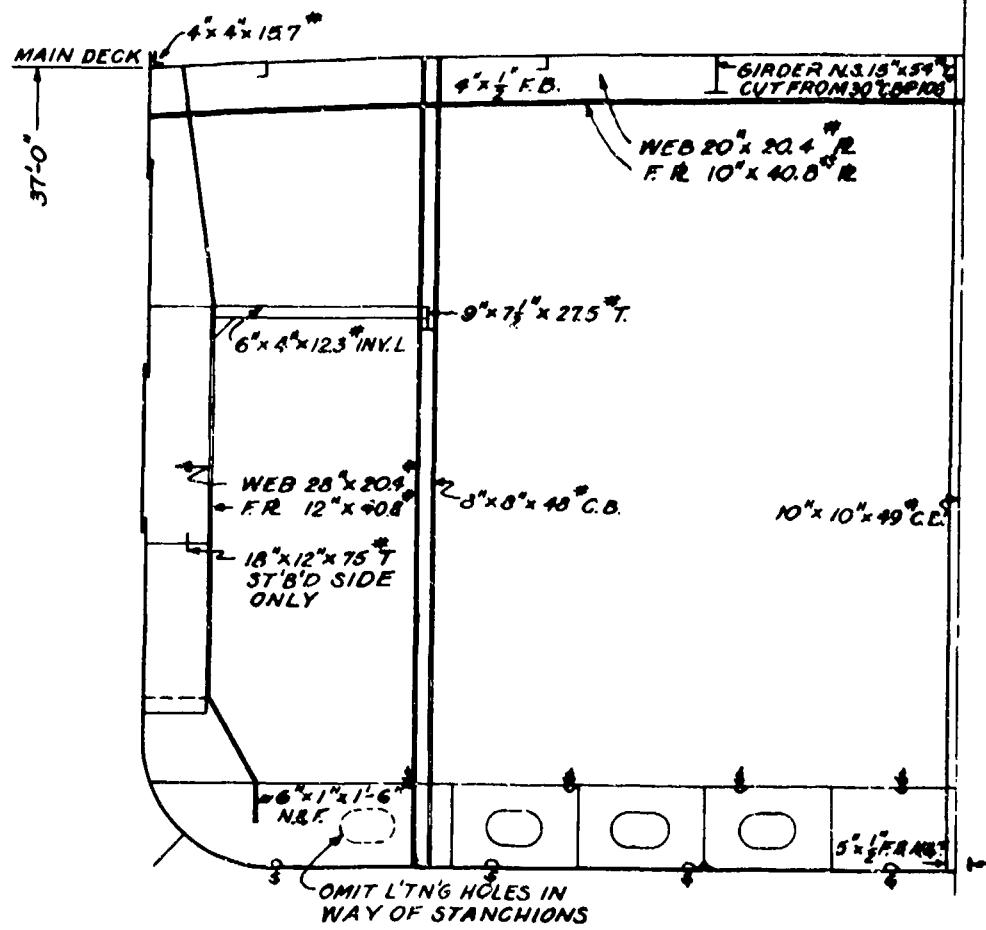
Ships Service Generators: Five units are installed.

Three - 250 KW. - 450 V. - A.C. and Two - 100 KW. 120/240 V. - D.C.

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FRAME 76 LOOKING AFT  
MIDSHIP SECTION

TEST A

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## TECHNICAL INSPECTION REPORT

### OVERALL SUMMARY

#### I. Target Condition After Test.

##### (a) Drafts after test: list; general areas of flooding, sources.

Drafts before Test A: Forward 11' 6"; Aft 17' 0";  
List 1° Port.

There is a reported increase in the draft aft of 6"  
and an increase in the port list to 2°. This may have been caused by  
leakage in the port shaft alley. However, inspection of the ship re-  
vealed no flooding.

##### (b) Structural damage.

#### HULL

There is no structural damage, however exposed sheet  
metal is slightly damaged.

#### MACHINERY

No comment.

#### ELECTRICAL

Not observed.

##### (c) Other damage.

#### HULL

No comment.

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## MACHINERY

None. All machinery was operated after Test A, and functioned normally.

## ELECTRICAL

There was no damage to electrical equipment.

### II. Forces Evidenced and Effects Noted.

#### (a) Heat.

##### HULL

Heat radiation caused slight blistering and scorching of paint on vertical surfaces normal to the burst. Jute lines, cargo nets, and canvas are slightly scorched.

## MACHINERY

No evidence.

## ELECTRICAL

None observed in the way of electrical equipment.

#### (b) Fires and explosions.

##### HULL

There were no explosions. The only fire burned a jute cargo net which was hanging over the side at frame 40, port.

## MACHINERY

No evidence.

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ELECTRICAL

There were no fires or explosions in the way of electrical equipment.

(c) Shock.

HULL

None.

MACHINERY

No evidence.

ELECTRICAL

There was no evidence of shock damage to electrical equipment.

(d) Pressure.

HULL

Blast caused dishing of light plating, tearing of canvas and shattering of glass.

MACHINERY

No evidence.

ELECTRICAL

There was no evidence of pressure damage to electrical equipment.

(e) Effects peculiar to the Atom Bomb.

HULL

None.

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**MACHINERY**

No evidence.

**ELECTRICAL**

No effects peculiar to the atom bomb were noted.

**III. Effects of Damage.**

**(a) Effect on machinery, electrical, and ship control.**

**HULL**

None.

**MACHINERY**

None.

**ELECTRICAL**

No effect on electrical equipment or ship control from  
Test A.

**(b) Effect on gunnery and fire control.**

**HULL**

None.

**MACHINERY**

No comment.

**ELECTRICAL**

No effect.

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(c) Effect on watertight integrity and stability.

HULL

None.

MACHINERY

No comment.

ELECTRICAL

No effect.

(d) Effect on personnel and habitability.

HULL

Exposed personnel might have been burned. Habitability is not affected.

MACHINERY

None.

ELECTRICAL

Habitability of the vessel was not affected from electrical damage.

(e) Effect on fighting efficiency.

HULL

None.

MACHINERY

None.

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## ELECTRICAL

There was no effect on the fighting efficiency of the vessel from electrical damage.

## IV. General Summary of Observers' Impressions and Conclusions.

### HULL

No comment.

### MACHINERY

The GENEVA was outside the effective range of the explosion in Test A.

### ELECTRICAL

There being only very minor damage, no conclusions were made by the observers.

## V. Preliminary General or Specific Recommendation of the Inspecting Group.

### HULL

None.

### MACHINERY

None.

### ELECTRICAL

None.

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## TECHNICAL INSPECTION REPORT

### SECTION I - HULL

#### GENERAL SUMMARY OF HULL DAMAGE

##### I. Target Condition After Test.

- (a) Drafts after test: list; general areas of flooding, sources.

Drafts before Test A: Forward 11' 6"; Aft 17' 0";  
List 1° P.

There is a reported increase in the draft aft of 6" and an increase in the port list to 2°. This may have been caused by leakage in the port shaft alley. However, inspection of the ship revealed no flooding.

- (b) Structural damage.

There is no structural damage, however exposed sheet metal is slightly damaged.

- (c) Other damage.

No comment.

##### II. Forces Evidenced and Effects Noted.

- (a) Heat.

Heat radiation caused slight blistering and scorching of paint on vertical surfaces normal to the burst. Jute lines, cargo nets, and canvas are slightly scorched.

- (b) Fires and explosions.

There were no explosions. The only fire burned a jute cargo net which was hanging over the side at frame 40, port.

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(c) Shock.

None.

(d) Pressure.

Blast caused dishing of light plating, tearing of canvas and shattering of glass.

(e) Effects peculiar to the atom bomb.

None.

### III. Effects of Damage.

(a) Effect on machinery, electrical, and ship control.

None.

(b) Effect on gunnery and fire control.

None.

(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

Exposed personnel might have been burned.  
Habitability is not affected.

(e) Effect on fighting efficiency.

None.

### IV. General Summary of Observers' Impressions and Conclusions.

No comment.

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V. Preliminary General or Specific Recommendations of Inspection Group.

None.

VI. Instructions for Loading the Vessel Specified the Following:

ITEM	LOADING
Fuel Oil	95%
Diesel Oil	95%
Ammunition	100%
Potable and reserve feed water	95%
Salt water ballast	None

Details of the actual quantities of the various items aboard are included in Report 7, Stability Inspection Report, submitted by the ship's force in accordance with "Instructions to Target Vessels for Tests and Observations by Ship's Force" issued by the Director of Ships Material. This report is available for inspection in the Bureau of Ships Crossroads Files.

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## DETAILED DESCRIPTION OF HULL DAMAGE

### A. General Description of Hull Damage.

Hull damage is extremely light and is confined to sheet metal, glass, canvas, and cordage. Damage was caused by blast and heat.

### B. Superstructure.

Sheet metal and other light structure has been somewhat damaged. The after side of the port flag bag is dished about three inches and is badly distorted. A first aid box on the top of the deckhouse at frame 67, port, has been blown inboard. The steel pipe frame of the movie booth on the after end of the navigating deck is distorted.

Canvas is damaged as follows:

(a) Windscreen on top of house, frames 67 to 72, starboard, is torn over its entire length.

(b) Windscreen on top of house, frames 67 to 72, port, is scorched and torn its entire length.

(c) Cover on signal bridge deck, frame 65, center-line, is scorched.

(d) Cover of movie projection booth is torn and scorched.

Paint is blistered on scattered places on superstructure port side bulkheads. Jute and manila and signal halyards are scorched. One signal halyard burned through.

### C. Turrets, Guns and Directors.

No damage.

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D. Torpedo Mounts, Depth Ch. Gear.

No damage.

E. Weather Deck.

The canvas covers on both cargo hatches, upper deck, are slightly scorched and torn. Several of the hatch boards were shaken loose and found on the deck below. The gig, stowed on the upper deck, frame 48, had the front windows of the cabin shattered and the window frame broken in one place. No movement was recorded by any of the deck deflection scratch gages installed between the main and upper decks.

F. Exterior Hull.

No damage.

G. Interior Compartments (above w.l.).

A joiner bulkhead at frame 100 on the main deck, starboard, is dished about two inches. This bulkhead is at the foot of a ladder opening to the upper deck. The doors at the head and foot of the ladder were open during the test, thus the damaged bulkhead was the only joiner bulkhead which was exposed to the blast pressure.

H. Armor Decks and Miscellaneous Armor.

Not Applicable.

I. Interior Compartments (below w.l.).

No damage.

J. Underwater Hull.

No damage.

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K. Tanks.

No damage.

L. Flooding.

Plumbing drains and flushing lines "backed up" into the ship's compartments. There is a reported increase in the draft aft of 6" and an increase in the port list of 1°. This may have been caused by leakage in the port shaft alley. However, inspection of the ship revealed no flooding.

M. Ventilation.

No damage

N. Ship Control.

No damage.

O. Fire Control.

No damage.

P. Ammunition Behavior.

No damage.

Q. Ammunition Handling.

No damage.

R. Strength.

No damage.

S. Miscellaneous.

No comment.

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T. Coverings.

Heat radiation caused slight blistering and scorching of the paint. Such damage is confined to a relatively small area on the after port quarter. There is no scorching of paint on decks. Due to difference in heat conductivity, wooden surfaces show more blistering than metal surfaces similarly exposed.

Curved surfaces show a graded blistering with the maximum normal to the burst. Photograph 1730-2; page 34, shows typical blistering of paint on steel. Photograph 1730-4; page 35, shows typical blistering on wood. Photograph 1730-3; page 36, shows the relation of blistering to the angle of radiation.

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TECHNICAL INSPECTION REPORT

SECTION II - MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

No data taken by machinery group.

(b) Structural damage.

No comment.

(c) Other damage.

None. All machinery was operated after Test A, and functioned normally.

II. Forces Evidenced and Effects Noted.

(a) Heat.

No evidence.

(b) Fires and explosions.

No evidence.

(c) Shock.

No evidence.

(d) Pressure.

No evidence.

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(e) Effects apparently peculiar to the atom bomb.

No evidence.

III. Effects of Damage.

(a) Effect on machinery and ship control.

None.

(b) Effect on gunnery and fire control.

No comment.

(c) Effect on water-tight integrity and stability.

No comment.

(d) Effect on personnel and habitability.

None.

(e) Total effect on fighting efficiency.

None.

IV. General Summary.

The GENEVA was outside the effective range of the explosion in Test A.

V. Preliminary Recommendation.

None.

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## DETAILED DESCRIPTION OF MACHINERY DAMAGE

### A. General Description of Machinery Damage.

#### (a) Overall condition.

There was no damage to the machinery of this vessel during Test A.

#### (b) Areas of major damage.

None.

#### (c) Primary cause of damage in each area of major damage.

Not applicable.

#### (d) Effect of target test on overall operation of machinery plant.

The overall operation of the machinery plant was not affected by the test.

### B. Boilers.

1. Undamaged. Both boilers were steamed after the test and functioned normally. Hydrostatic tests indicate no change in the tightness of the boilers.

2. Boiler #1 was under 450 pounds of steam pressure and boiler #2 was under 450 pounds of hydrostatic pressure when the crew left the ship at 1000 on 30 June. On 2 July at 1205 when the ship was reboarded, boiler #1 was down to zero and #2 boiler had 86 lbs/sq. in hydrostatic pressure remaining.

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## HYDROSTATIC TESTS ON BOILER #2

	Before Test A	After Test A
Initial Pressure.	450 lbs/sq. in.	450 lbs/sq. in.
Time required for pressure to drop.		
100 lb.	42 minutes	50 minutes.
200 lb.	7 1/2 hours	4 hours.
Pressure after		
12 hours	150 lb/sq. in.	170 lb/sq. in.
24 hours	70 lb/sq. in.	120 lb/sq. in.

### C. Blowers.

Undamaged. All four blowers were operated with their respective boilers at five inches of water pressure. No defects were found.

### D. Fuel Oil Equipment.

Undamaged. All fuel oil equipment has been tested and no defects found.

### E. Boiler Feedwater Equipment.

Undamaged. All feedwater equipment has been tested and no defects found.

### F. Main Propulsion Machinery.

Undamaged. Both turbines were run for 30 minutes at no load and 1000 RPM. The shafts were turned over in both directions for a few minutes with the turbines operating at light load. No damage was found.

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G. Reduction Gears.

Not applicable.

H. Shafting and Bearings.

Undamaged. The shafting was turned by power in both directions and no defects were found.

I. Lubrication System.

Undamaged. The lubrication system was tested in operation and no defects were found.

J. Condensers and Air Ejectors.

Undamaged. All of the main and auxiliary condensers were tested in operation at 29 1/2 inches of vacuum and no damage was found.

K. Pumps.

Undamaged. All pumps have been tested and no defects found.

L. Auxiliary Generators (Turbines and Gears).

Undamaged. All turbines and gears of the turbo generators have been tested and operated satisfactorily.

M. Propellers.

Undamaged. The propellers were inspected from the surface of the water and turned over. No defects were found.

N. Distilling Plant.

Undamaged. The evaporators were placed in service immediately after Test A, and functioned normally.

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O. Refrigeration Plant.

Undamaged. The refrigerating plant was placed in operation immediately after Test A, and functioned normally.

P. Winches, Windlasses, and Capstans.

Undamaged. All of the deck machinery has been tested. No defects were found.

Q. Steering Engine.

Undamaged. Both steering units were tested from all stations and no defects were found.

R. Elevators, Ammunition Hoists, etc.

Undamaged. The gasoline hoist and the two ammunition hoists were tested and operated normally.

S. Ventilation (Machinery).

Undamaged. The ventilation machinery has been operated and functions normally.

T. Compressed Air Plant.

Undamaged. The air compressor has been operated, and functions normally.

U. Diesels (Generators and Boats).

Undamaged. Both diesel fire pumps have been operated for 30 minutes at 90 pounds pressure. The emergency diesel generator was operated under load and functions normally.

V. Piping Systems.

Undamaged. All of the piping was tested at normal operating pressure.

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W. Miscellaneous.

Undamaged. The laundry, galley, and machine shop equipment were operated after Test A. They function normally.

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TECHNICAL INSPECTION REPORT

SECTION III - ELECTRICAL

GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test, list, general areas of flooding, sources.

Not observed.

(b) Structural damage.

Not observed.

(c) Other damage.

There was no damage to electrical equipment.

II. Forces Evidenced and Effects Noted.

(a) Heat.

None observed in the way of electrical equipment.

(b) Fires and explosions.

There was no fires or explosions in the way of electrical equipment.

(c) Shock.

There was no evidence of shock damage to electrical equipment.

(d) Pressure.

There was no evidence of pressure damage to electrical equipment.

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(e) Any effects apparently peculiar to the atom bomb.

No effects peculiar to the atom bomb were noted.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

No effect on electrical equipment or ship control from Test A.

(b) Effect on gunnery and fire control.

No effect.

(c) Effect on water-tight integrity and stability.

No effect.

(d) Effect on personnel and habitability.

Habitability of the vessel was not affected from electrical damage.

(e) Total effect on fighting efficiency.

There was no effect on the fighting efficiency of the vessel from electrical damage.

IV. General Summary of Observers' Impressions and Conclusions.

There being only very minor damage, no conclusions were made by the observers.

V. Preliminary General or Specific Recommendations of the Inspecting Group.

No recommendations.

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## DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

### A. General Description of Electrical Damage.

#### (a) Overall condition.

Very good, the vessel suffered no electrical damage from Test A.

#### (b) Areas of major damage.

Not damaged.

#### (c) Primary causes of damage in each area of major damage.

Not damaged.

#### (d) Effect of target test on overall operation of electric plant.

1. Ships service generators	Not damaged.
2. Engine & boiler auxiliaries	Not damaged.
3. Electric propulsion	Not damaged.
4. Communications	Not damaged.
5. Fire Control circuits	Not damaged.
6. Ventilation	Not damaged.
7. Lighting	Not damaged.

#### (e) Types of equipment most affected.

No electrical equipment affected from Test A.

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B. Electric Propulsion Rotating Equipment.  
Not damaged.

C. Electric Propulsion Control Equipment.  
Not damaged.

D. Generators - Ships Service.  
Not damaged.

E. Generators - Emergency.  
Not damaged.

F. Switchboards, Distribution and Transfer Panels.  
Not damaged.

G. Wiring, Wiring Equipment and Wireways.  
Not damaged.

H. Transformers.  
Not damaged.

I. Submarine Propelling Batteries.  
Not Applicable.

J. Portable Batteries.  
Not damaged.

K. Motors, Motor Generator Sets and Motor Controllers.  
Not damaged.

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L. Lighting Equipment.

Not damaged.

M. Searchlights.

Not damaged.

N. Degaussing Equipment.

Not damaged.

O. Gyro Compass Equipment.

Not damaged.

P. Sound Powered Telephones.

Not damaged.

Q. Ship's Service Telephones.

Not Applicable.

R. Announcing Systems.

Not damaged.

S. Telegraphs.

Not damaged.

T. Indicating Systems.

Not damaged.

U. I.C. and A.C.O. Switchboards.

Not damaged.

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V. F.C. Switchboard.

Not damaged.

W. Miscellaneous.

No comment.

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SECTION IV

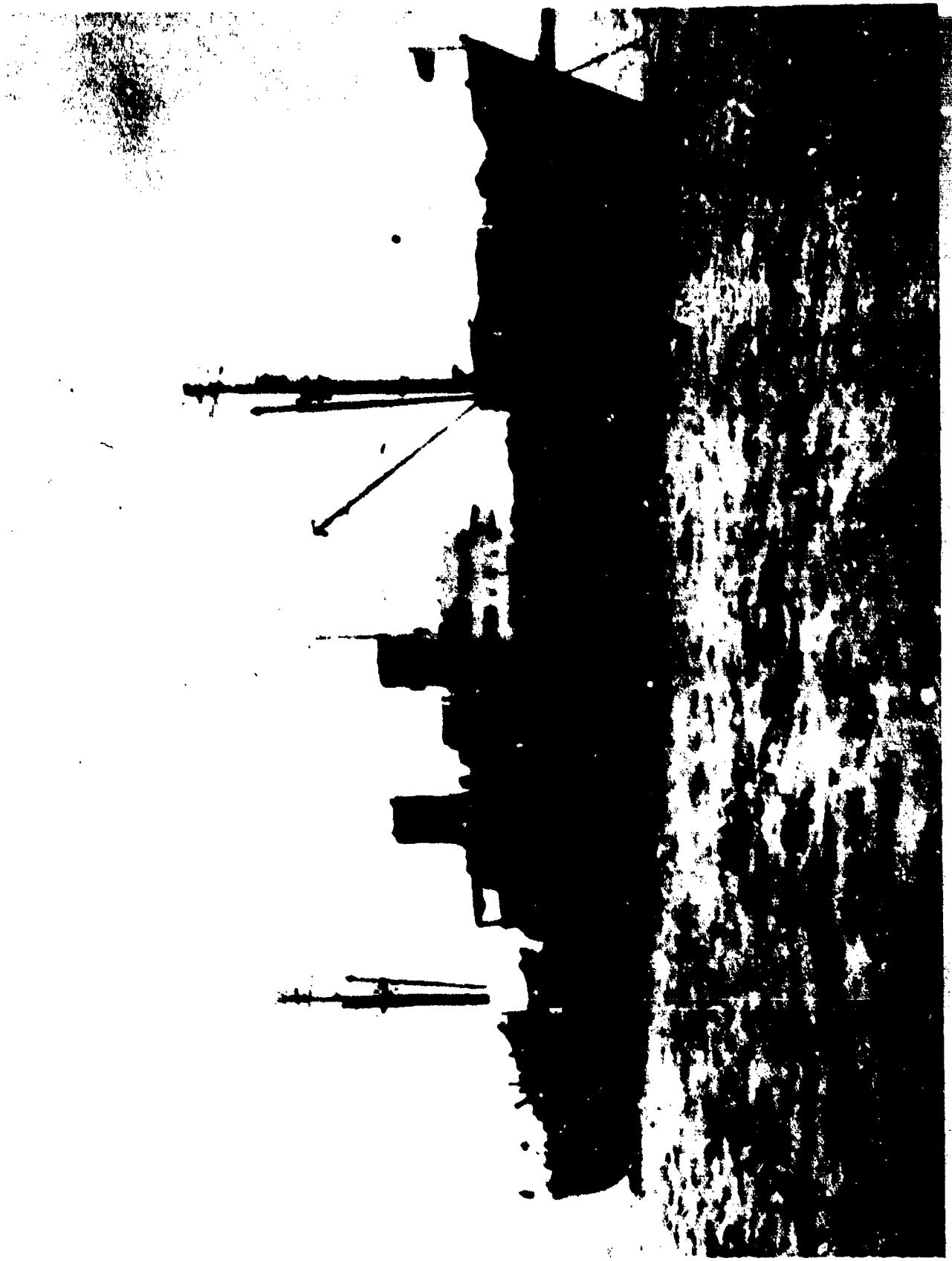
PHOTOGRAPHS

TEST ABLE

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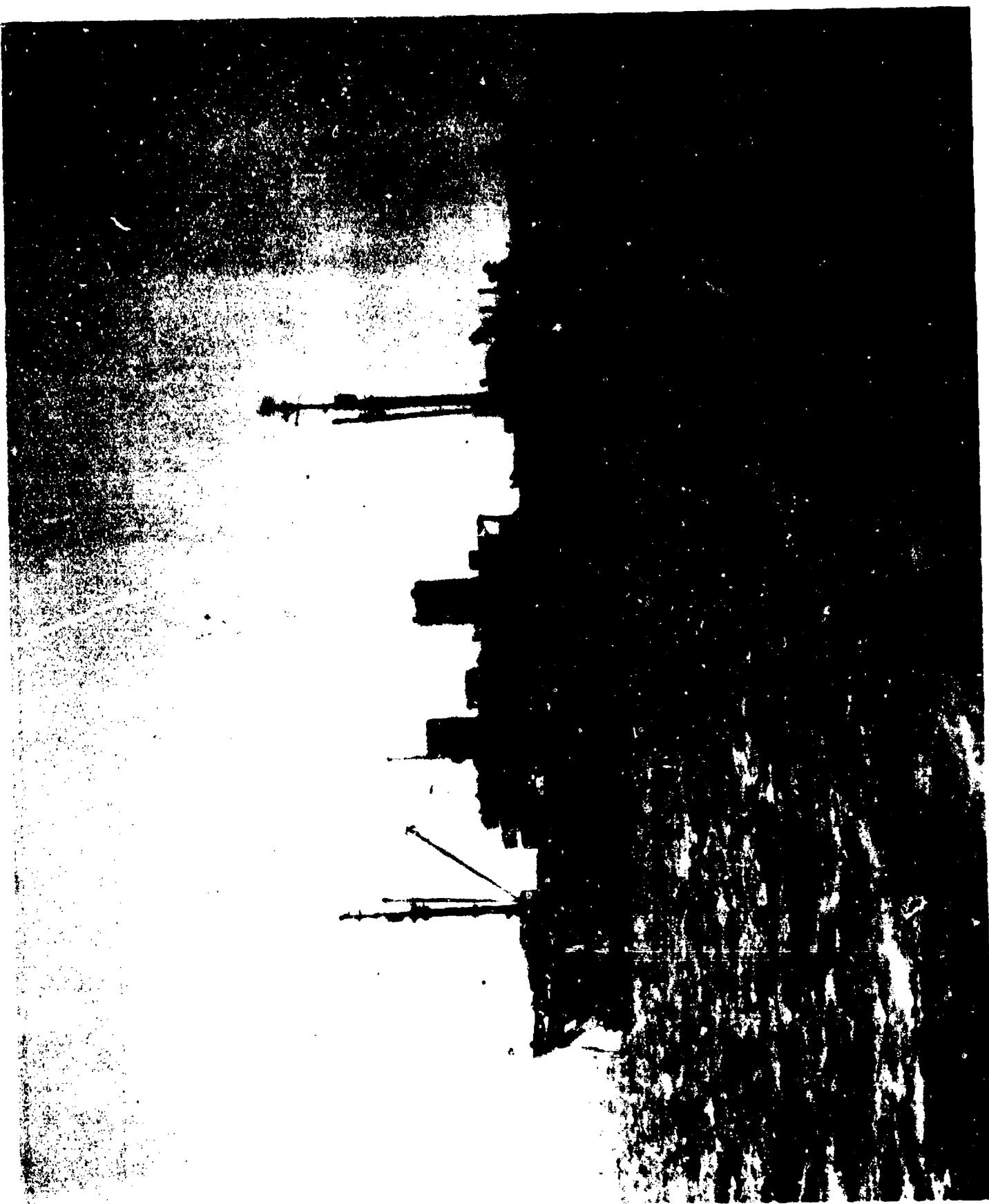


AA-CR-227-49-37. Starboard bow after Test A.

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AA-CR-227-49-41. Port quarter after Test A.

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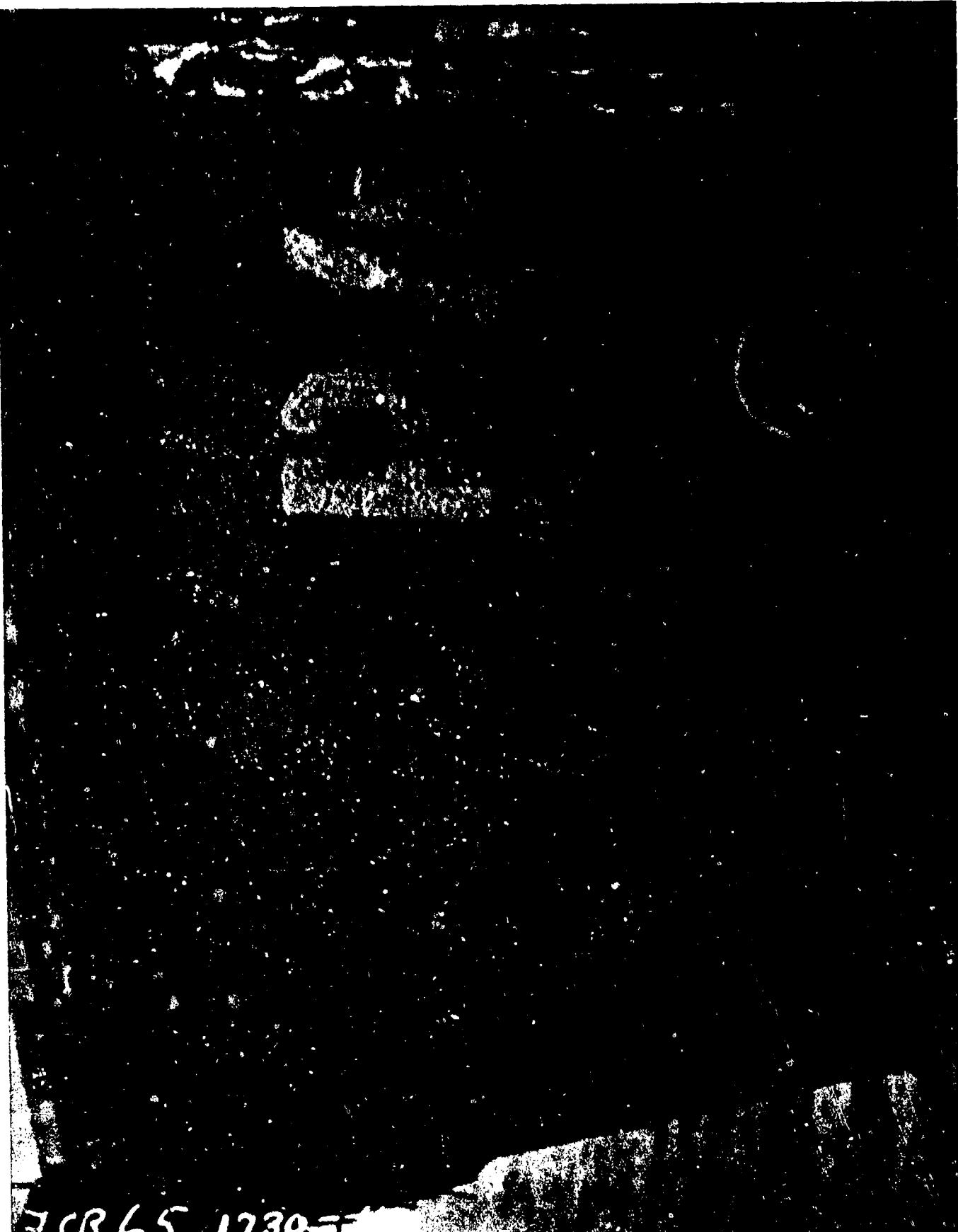
AA-CR-65-1730-2. Blistered paint on T-section stanchion, main deck, frame 76, port.

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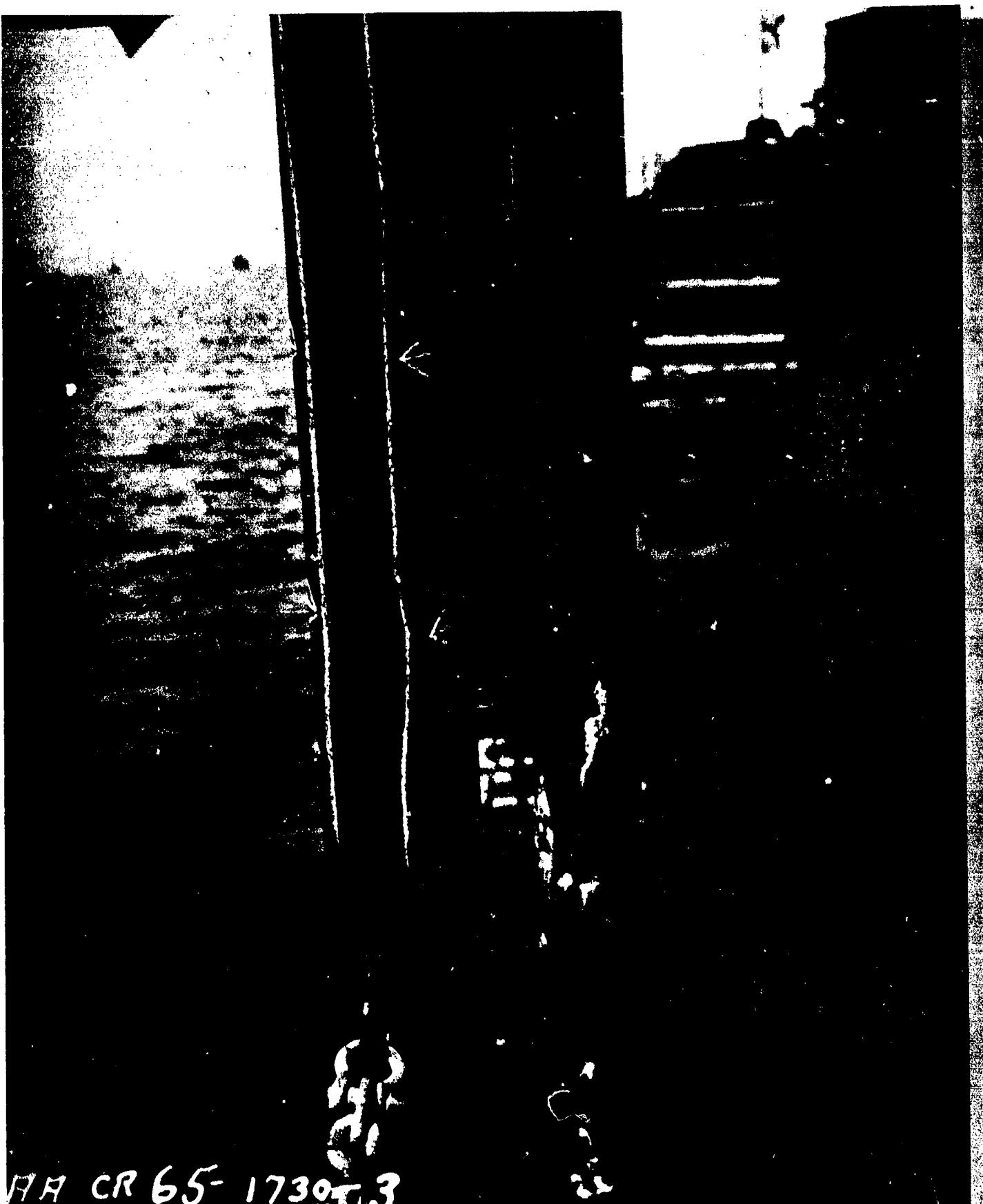
AA-CR-65-1730-4

AA-CR-65-1730-4. Blistered paint on stern of wood boat, upper deck, port.

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AA-CR-65-1730-3. Blistered paint on pipe stanchion upper deck, frame 67, port.

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**APPENDIX**

**COMMANDING OFFICERS REPORT**

**TEST ABLE**

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REPORT #11

COMMANDING OFFICERS REPORT

SECTION I

This target vessel is the U.S.S. GENEVA, Attack Transport No. 86 of the APA 57-87 class, built by the Consolidated Steel Corporation at Wilmington, California for the U.S. Maritime Commission in accordance with BuShips specifications. It was turned over to the U.S. Navy in March 1945.

Bearing and distance of GENEVA's foremast from NEVADA's foremast was approximately 173 true, distance 2800 yards before and after the test.

The material condition and the equipment of the vessel was not affected to any serious degree. The effect on the ability of the ship to resist damage of any special material (especially that of an explosive or inflammable nature) on board at the time of the test may be summarized as follows:

Jute line is more inflammable than manila line.

Glass is highly shatterable and should be replaced by heat resisting transparent material such as plexiglass.

White materials are more resistant to heat effects than other colors. This was noticeable on the woodwork of the boats cradled on the port side, the white lettering was unblistered while the grey paint was blistered badly. Also, life rings painted white were unharmed. A white canvas hammock exposed on the port side was not even scorched whereas grey-painted canvas screens were heavily scorched.

Unpainted wooden surfaces are more resistant to heat than painted surfaces. This was noticed on the painted wooden cylinder of the compass binnacle on top of the house as compared to the unpainted animal crates placed in that vicinity.

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The damage due to blast effect was somewhat greater than the heat effect, witness the breaking of the glass, the tearing of canvass screens, the denting of scantlings under 1/16 inch thickness, the demolition of the movie booth. Also, plumbing drains and flushing lines "backed up" into the ships compartments making a dirty mess. Also, an abnormally large amount of soot was scattered throughout the ship and some of it was forced into the paintwork. A beneficial effect was noticeable in the ventilation system and especially in the improved efficiency of the forced draft blowers which maintained the same level of air pressure in the firerooms with much less R.P.M.

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USS GENEVA (APA 86)

## SECTION II

The general summary of damage suffered by this vessel as a result of the test is slight. This consisted of slight topside damage due to blast and heat effects. The ability of the vessel to remain in action and its fighting efficiency was not impaired. No machinery, electrical, ship control, fire control, gunnery, electronics, watertight integrity, stability was affected. All remains in operable condition.

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USS GENEVA (APA86)

### SECTION III

The effects of Target Test Able on this vessel were negligible. Special test materials on board; such as, animals, bombs, clothing samples, instrumentation and the lack of a crew on board, did not adversely affect the outcome as no serious fire and no flooding occurred.

In view of the slight damage to this vessel, no important changes in the design or arrangement features of this type vessel can be visualized.

The following general observations and recommendations are submitted:

Vital scantlings should not be less than 1/4 inch in thickness.

All doors should be quick-closing to protect personnel from heat and blast effects.

Flash clothing should be of white cotton material.

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USS GENEVA (APA 86)



**Defense Special Weapons Agency**  
6801 Telegraph Road  
Alexandria, Virginia 22310-3398

10 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER  
ATTENTION: OMI/Mr. William Bush

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency (formerly Defense Nuclear Agency) Security Office has reviewed and declassified the following reports:

AD-366718 XRD-32-Volume 3

AD-366726 XRD-12-Volume 2

AD-366703 XRD-16-Volume 1

AD-366702 XRD-14-Volume 2

AD-376819L XRD-17-Volume 2

AD-366704 XRD-18

AD-367451 XRD-19-Volume 1

AD-366705 XRD-20-Volume 2 AD-366705

AD-376028L XRD-4

AD-366694 XRD-1

AD-473912 XRD-193

AD-473891 XRD-171

AD-473899 XRD-163

AD-473887 XRD-166

AD-473888 XRD-167

AD-473889 XRD-168

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10 April 1997

SUBJECT: Declassification of Reports

AD-B197749	XRD-174
AD-473905	XRD-182
AD-366719	XRD-33 Volume 4
AD-366700	XRD-10
AD-366712	XRD-25 Volume 1
AD-376827L	XRD-75
AD-366756	XRD-73
AD-366757	XRD-74
AD-366755	XRD-72
AD-366754	XRD-71
AD-366710	XRD-23 Volume 1
AD-366711	XRD-24 Volume 2
AD-366753	XRD-70
AD-366749	XRD-66
AD-366701	XRD-11
AD-366745	XRD-62.

All of the cited reports are now **approved for public release; distribution statement "A" applies.**

*Ardith Jarrett*  
ARDITH JARRETT  
Chief, Technical Resource Center

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*Completed*

*B.w*